SCIENTIFIC CORN BREEDING

THE PIONEER WAY

POLLEN GUN

THE MOST EXTENSIVE CORN BREEDING PROGRAM IN THE CORN BELT

PRINCETON

PIONEER HI-BRED CORN COMPANY

OF ILLINOIS

PIONEER CORN BREEDERS

THEIR LABORATORY and workshop the rich soil of the Corn Belt, Pioneer corn breeders scientifically develop and produce hybrid seed corn which, year after year, leads the field in superior quality and outstanding performance.

Their tireless efforts and experimental research set the pace for hybrid corn development and make invaluable contributions toward better farm and higher agricultural standards in the corn country.

Special corn investigations are made for Pioneer by Mr. Goodsell who has worked two years for the company, and holds a B. S. degree from Iowa State College and an M. S. degree from Texas A. & M.

Mr. Baker, corn breeding specialist and graduate of Iowa State College, has been with the Pioneer Hi-Bred Corn Company for eight years.

Yield Test Programs and the Johnston Inbred Plot are Mr. Weatherspoon's work. He has had five years of service with Pioneer, and holds a B. S. degree from Oregon State College and an M. S. degree from Iowa State College.

Parent Corn production is handled by Mr. Woods, who has worked for four years with the Pioneer Hi-Bred Seed Corn Co.

Pioneer's Argentine corn plots are conducted by Mr. Brawner, who holds B. S. and M. S. degrees from Nebraska University.

The Rolfe inbred plot is supervised by Mr. Collins. Eight years with Pioneer, Mr. Collins attended Iowa State College.

INBREEDING—THE FIRST STEP

INBREEDING A STALK OF CORN

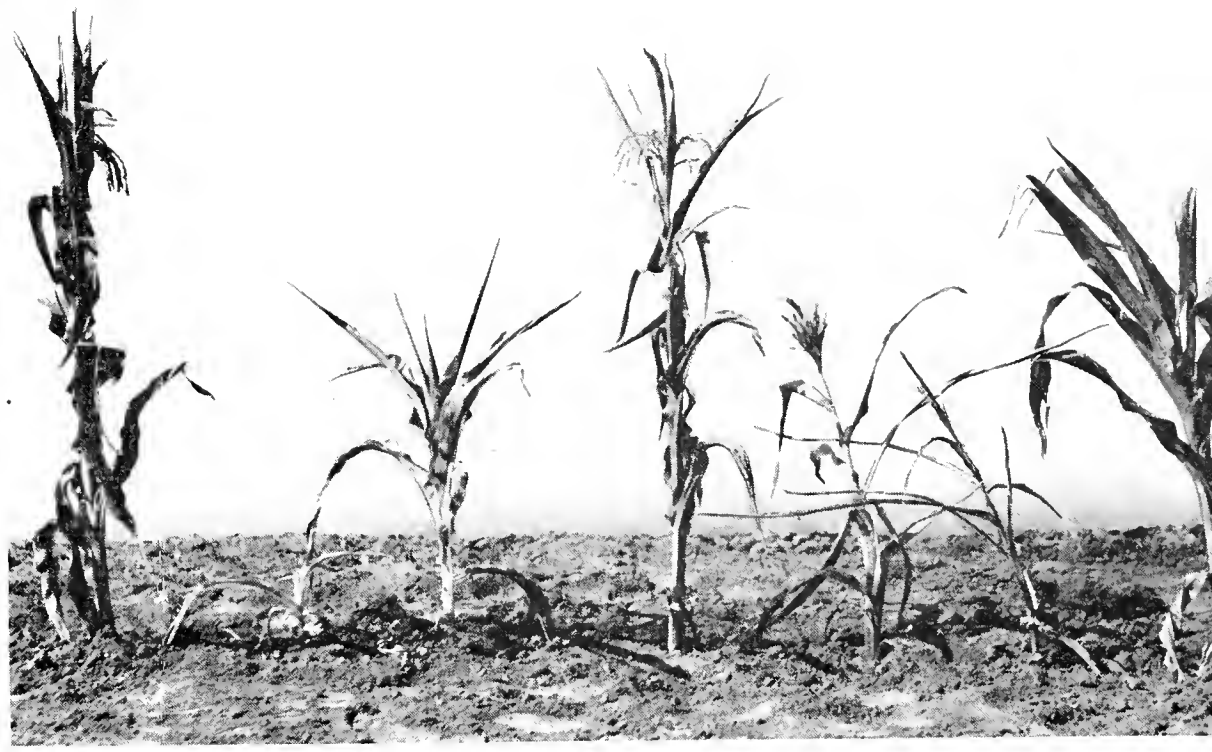
PIONEER CORN BREEDERS employ every scientific method known in plant breeding to produce hybrid seed corn of outstanding quality.

Inbreeding selected open-pollinated corn to itself uncovers varied plant types, some offsprings turning out strong and vigorous and others weak and useless. Pioneer breeders, each year, discard thousands of weak plants, saving only desirable types for further development.

After many years of careful inbreeding, weak and undesirable characteristics become weeded out. Only the strongest plant varieties survive the rigorous inbreeding period which usually lasts from five to eight years.

The result is a pure inbred, small and frail in appearance, but uniform and true to definite characteristics, such as disease resistance, plant height, stiffness of stalk, heaviness of root system, size of ear, ear height, and color of leaf.

An inbred strain remains pure, and breeds true to its characteristics as long as foreign pollen does not contaminate it.

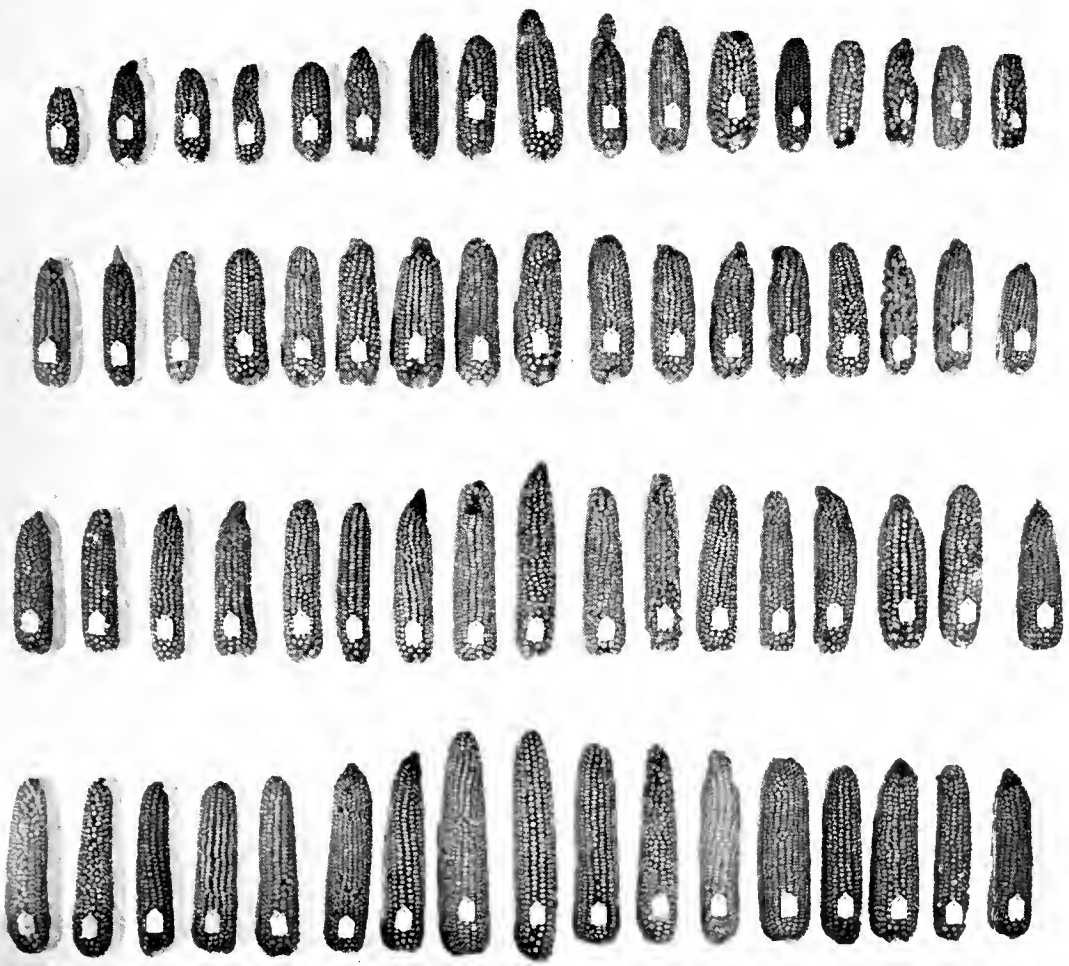


Inbreeding separates weak and strong plants. These plants are descendants of the same original ear of open-pollinated corn. Only healthy offsprings are saved.

The Pioneer Company owns the largest and most valuable supply of inbred seed stocks. Shown below are some of the inbred parent strains.

A Pioneer inbred strain showing uniformity of plant size and ear height after six years of rigorous inbreeding.

A FEW PIONEER INBREDS



PIONEER CORN BREEDING IN SOUTH AMERICA

NATIVE DETASSELERS WHO WORK IN PIONEER'S ARGENTINE CORN PLOTS

PIONEER BREEDING PLOT IN ARGENTINA

Years Ahead

TODAY, Pioneer Hi-Bred offers 1940 model hybrids for 1938 planting.

Years ago, Pioneer corn breeders began growing two experimental corn crops every year so that new and better hybrids could be developed in only half the time ordinarily required.

At first, the winter crop was grown in greenhouses, but the rapidly expanding breeding work soon outgrew this method. It became necessary to go to Argentina, South America, for each year's second crop.

Since the South American summer comes during our winter months, the Argentine corn plots enable Pioneer corn breeders to do two years of large scale development work in one.

The new group of superior hybrids Pioneer is placing on the market for 1938 planting is the outgrowth of our "year around" breeding work, and is the envy of the hybrid seed corn business.

The marketing of these new, improved crosses would have been impossible for another five or six years if we pursued the ordinary course of producing only one experimental crop a year.

All Pioneer Hi-Bred Seed Corn sold to customers is grown in the Corn Belt and not in South America. The work carried on in Argentina is restricted to the development of inbreds and primary crosses. Pioneer Hi-Bred Seed Corn is not sold in South America.

MAKING AND TESTING EXPERIMENTAL HYBRID CROSSES—THE SECOND STEP

PIONEER BREEDERS make about 175,000 hand pollinations every year.

When corn breeders cross two pure inbreds, each having different characteristics, the offspring, a "two-way" or "single cross," inherits its parents' best characteristics, growing stronger and more vigorous than either.

Out of thousands of "single crosses" produced every year, only a few are good enough to use for experimental work on final "four-way crosses."

The "four-way" hybrid cross is developed by crossing a pair of "two-way" or "single crosses," each of which possesses unlike characteristics.

Of the hundreds of final crosses made each year by Pioneer corn breeders, only a few prove superior to the present commercial hybrids.

These few outstanding combinations are then tested, over a number of years, for yield, lodging, and maturity, in localities where they are to be sold.

POLLEN BAGS ON TASSELS; GLASSINE BAGS OVER EAR-SHOOTS

CROSSING TWO INBREDS TO PRODUCE A "SINGLE CROSS"

BREEDERS CROSSING TWO "SINGLE CROSS" HYBRIDS

THE TWO INBREDS ON EITHER SIDE WERE CROSSED TO PRODUCE HYBRID IN THE CENTER

INCREASING THE SUPPLY OF PARENT CORN—THE THIRD STEP

AFTER NEW PIONEER HYBRIDS demonstrate and prove their superiority throughout the testing period lasting from three to five years, they are ready for commercial production.

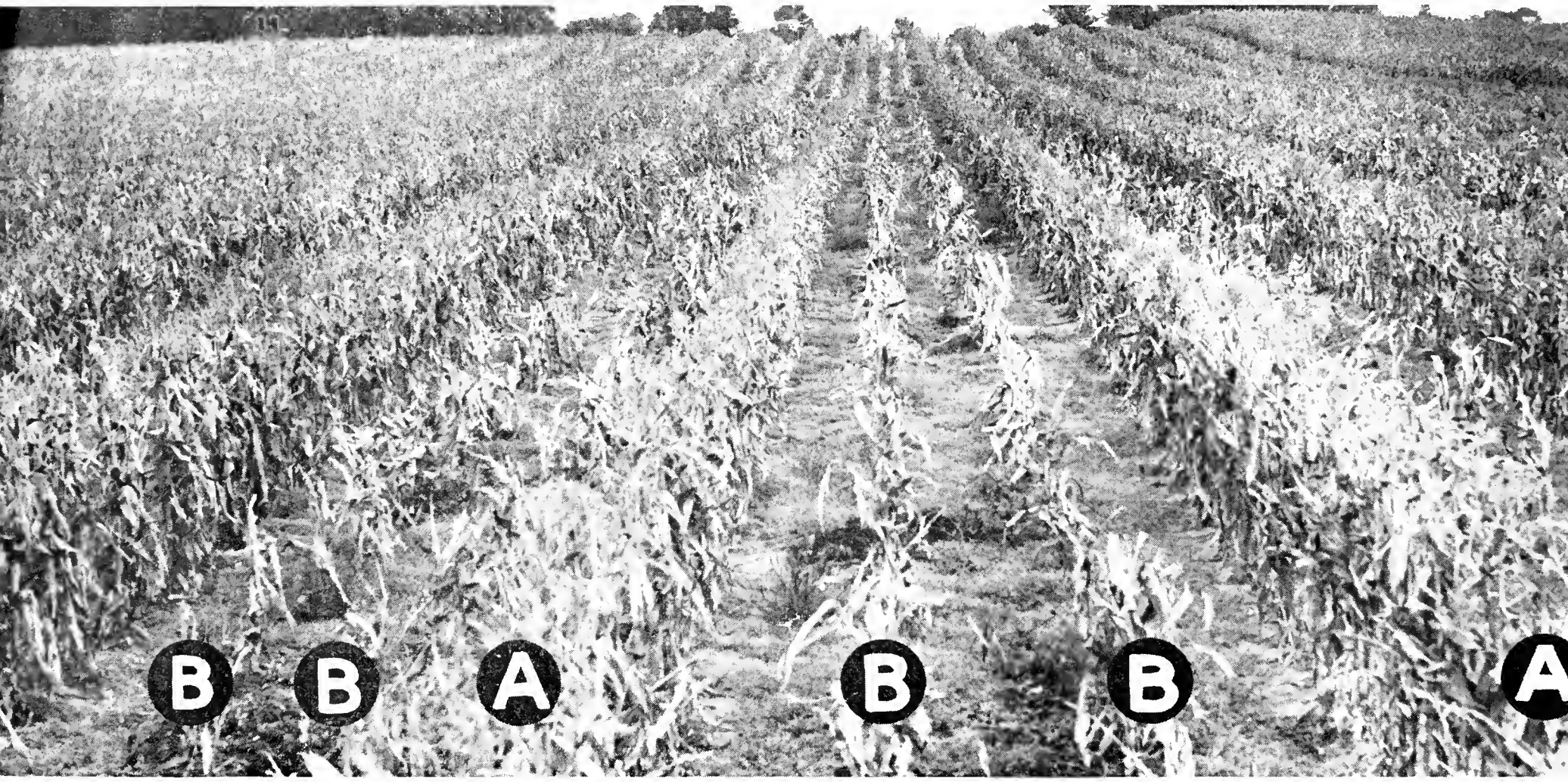
But before a new hybrid can be produced on a large scale, an increase must be made on the supply of seed for the inbreds which make up its parentage.

Each of the four original inbred strains is planted in isolated fields located 40 or more rods from the nearest corn field to protect the plots from foreign pollen.

The seed harvested from the four fields is used to plant the four inbreds we will call A, B, C and D. These are then cross-bred in pairs to produce two "single crosses."

To produce a "single cross," Pioneer corn breeders alternate one row of Inbred A (male) with two rows of Inbred B (female) all through a field. The female is detasseled to prevent self-pollination. The pollen from the tassels of male Inbred A cross-pollinates the silks of female Inbred B.

Inbreds C (male) and D (female) are hybridized in the same manner. Seed picked from female rows B and D grows two different "single crosses" which are then crossed to make the final "four-way" hybrid crosses.



TOP—A FIELD SHOWING TWO STRAINS OF INBREDS, A AND B, BEING CROSSED

BOTTOM—A CROSSING FIELD OF TWO OTHER STRAINS OF INBREDS, C AND D

THE FINAL "FOUR-WAY" HYBRID CROSS—THE FOURTH STEP

A DETASSELED FIELD

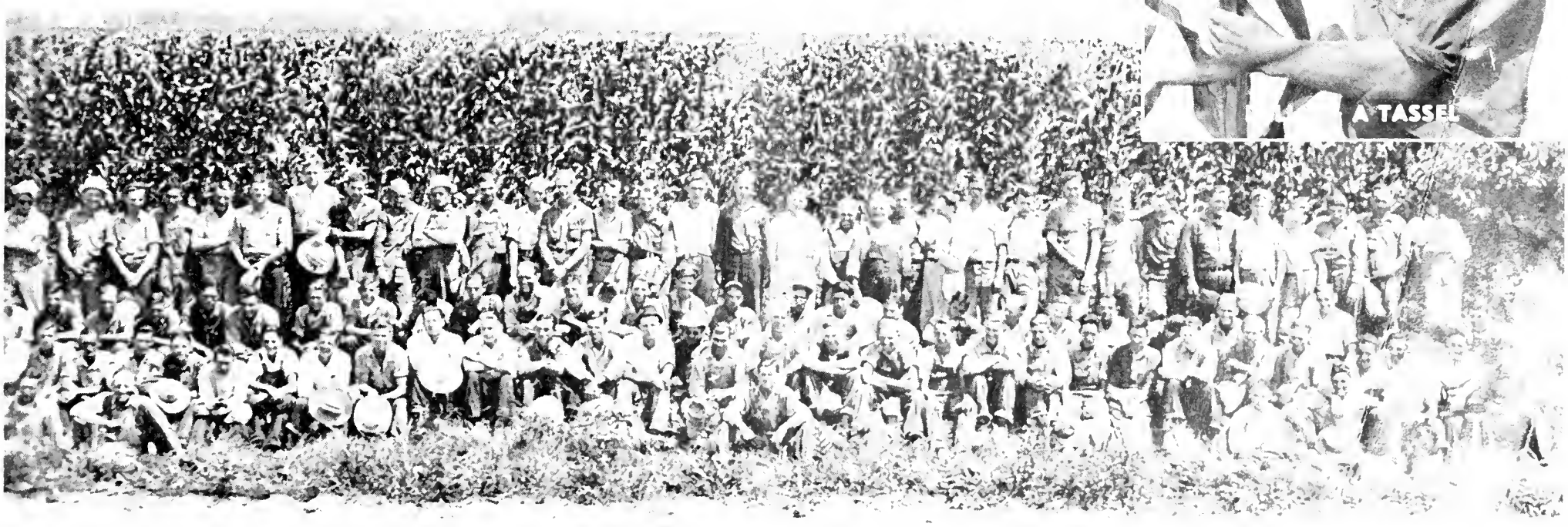
WHEN THE SEED SUPPLY used in planting the two "single crosses" becomes large enough, the final "four-way" hybrid seed is produced in large Pioneer crossing fields from which the commercial seed corn is harvested.

These fields require hundreds of capable men each summer for detasseling work. The fields are detasseled from twelve to fifteen times.

Pioneer corn breeders alternate four rows of one "single cross" (AxB) with one row of another "single cross" (CxD) all through a field. Each group of four rows (female) is detasseled, and the pollen from tassels of the one row (male) cross-pollinates the silks of the detasseled rows. The result is a "four-way" hybrid cross.

Pioneer Hi-Bred Seed Corn is picked only from the detasseled rows. The corn harvested from the male rows pollinates itself and cannot be used as hybrid seed corn.

A TASSEL



HUNDREDS AND HUNDREDS OF CAPABLE DETASSELERS WORK IN PIONEER SEED FIELDS EVERY SUMMER

RESULTS

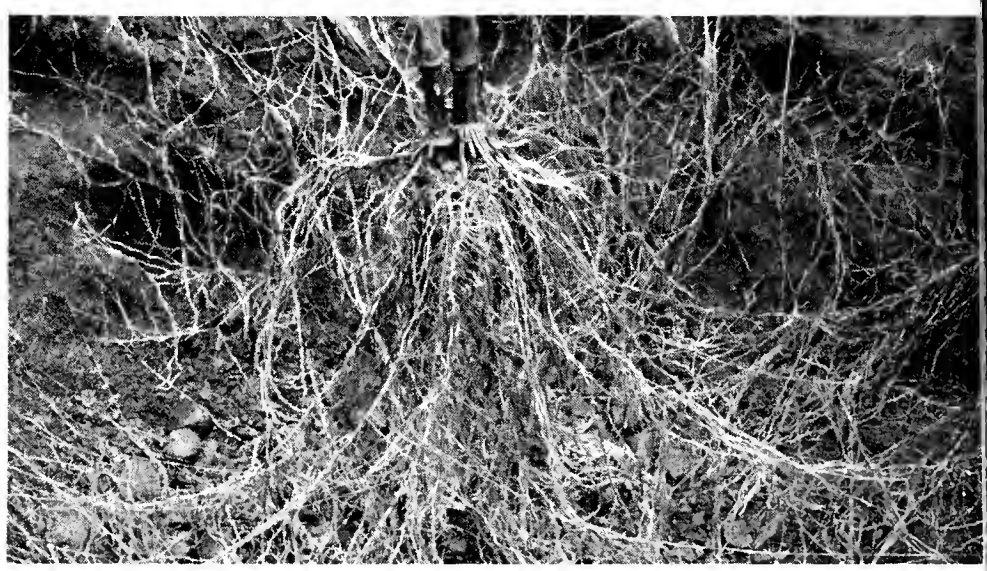
SUPERIOR CORN BREEDING gives Pioneer Hi-Bred seed corn these characteristics—higher yield, stiff, sturdy stalks, heavy root system, strong shanks, large, sound ears, drought and disease resistance, uniformity, strong germination, and proper maturity.

Pioneer Corn is noted for early maturity and high shelling percentage resulting from extremely small cobs and deep grains.

OPEN-POLLINATED (Left) AND PIONEER (Right) CORN AFTER A WIND STORM

PIONEER STALKS (LEFT) ALWAYS GROW ONE OR TWO EARS WHILE MANY OPEN-POLLINATED STALKS (RIGHT) REMAIN BARREN

MERCIAL HYBRID CORN GROWN FROM PIONEER SEED CORN



THE TYPICAL ROOT SYSTEM OF PIONEER HI-BRED CORN

THE PIONEER HI-BRED CORN COMPANY was the first commercial producer of hybrid seed corn. It operates in the hybrid seed corn business exclusively. The hybrid business is not just a side line with the Pioneer Company. Pioneer does not contract with small inexperienced growers to produce Pioneer hybrid seed corn.

It is little wonder Pioneer has the parent seed stocks to enable them to produce the majority of the hybrid strains sold throughout the corn belt. Pioneer does not produce all of these hybrids. Our breeding department has made extensive tests and we concentrate our production on the corn we find to be the most practical for the corn grower to produce. Pioneer puts out a better bred, sorted, dried and graded hybrid seed corn.